■ KLCS-47E, 47, 470, 470A Series

■ Features

	47E Series	47 Series	470 Series	470A Series
Maximum ROM size	4K × 8		8K × 8	16K × 8
Maximum RAM size	256 × 4	768 × 4	1024 × 4	
Minimum instruction execution time	1.0μs (at 8MHz, V_{DD}=2.7V~5.5V) 1.3μs (at 8MHz, V_{DD}=4.5V~5.5V) 1.9μs (at 8MHz, V_{DD}=2.7V~5.5V) 3.2μs (at 8MHz, V_{DD}=2.7V~5.5V)	1.9μs (at 4.2MHz, V_{DD}=4.5V~6V)	1.3μs (at 6MHz, V_{DD}=4.5V~5.5V) 244μs (at 32.8MHz, V_{DD}=2.7V~5.5V)	
Number of instructions	90		92	105
Number of interrupts	5/6	6		
Packages	DIP16~20 SOP16~28 SDIP28~42 SSOP30 QFP44	SDIP30~42 QFP44~80	SDIP28~64 QFP44~100	SDIP42~64 QFP44~80

■ Basic functions

- Instructions: maximum 105, minimum instruction execution time: 1.0μs
- ROM table look-up instruction
- 5-bit to 8-bit data conversion instruction
- Subroutine nesting: maximum 15 levels
- Interrupt sources: 2 external, 4 internal
- Interval timer
- Serial interface

■ Additional functions

- VFT driver
- LCD driver
- LED driver
- Hold function (low power consumption mode)
- Multi-pin input/output
- D/A conversion (PWM) output
- A/D conversion input
- A/D converter input
- E^2PROM
- 16-bit high-speed event counter
- On-screen display circuit
- DTMF generator
- DTMF receiver
- Watchdog timer
- Pulse generator
- Remote control pulse detector
- High-speed timer/counter
- Dual clock system
- One-time PROM

■ KLCS-47E, 47 Series Selection Guide

ROM (byte)	RAM (nibbles)	Product No	Driver			SIO		A/D converter	A/D conversion input	Pulse output			Remote control pulse detector	Watchdog timer	High-speed event counter	DTMF generator	OSD		Dual clock	Hold function	Package			OTP type	Minimum operating voltage (●: 2.7V, ◉: 2.2V)
			LED	LCD	VFT	4-bit	8-bit			PWM	PPG	Pulse					Bar display	Character			SDIP(DIP)	QFP(SOP)	QFP(SSOP)		
1k	64	KMP47C101P/M	4																	●	16	16		●	◉
		KMP47C102P/M	4											●						●	20	20		●	◉
		KMP47C103N/M	8				1							●						●	28	28		●	◉
		†KMP47E187M												●						●		16		●	◉
		†KMP47E186M												●						●		16		●	◉
2k	128	KMP47C201P/M	4																	●	16	16		●	◉
		KMP47C202P/M	4											●						●	20	20		●	◉
		KMP47C203N/M	8				1							●						●	28	28		●	◉
		KMP47C200BN/BF	8			1														●	42	44		●	●
		* KMP47C206P/M	5									1		●						●	20	20		●	
		KMP47C210AN/AF			20	1														●	42	44		●	
		KMP47C212AN			20	1														●	42				
		KMP47C231AN	8				1		5				●							●	30				
		KMP47C233AN	8						1											●	42				
		KMP47C241N/M	5			1		4						●						●	28	28		●	●
		KMP47C242BN	8					4				1		●						●	30			●	●
		KMP47C243N/M/DM	8				1	8				1		●						●	28	28		●	◉
	192	KMP47C221ADF		24		1														●				●	
		KMP47C222N/F		20			1	4				1		●					●	●	42	44		●	◉
4k	256	KMP47C400BN/BF	8			1														●	42	44		●	●
		KMP47C410AN/AF			20	1														●	42	44		●	
		KMP47C412AN			20	1														●	42				
		KMP47C421ADF		24		1														●		64		●	
		KMP47C422N/F		20			1	4				1		●					●	●	42	44		●	◉
		KMP47C423ADF		24		1						1			1					●		64			
		KMP47C433AN	8						1											●	42				
		KMP47C440BN/BF	8			1				8				●						●	42	44		●	
		KMP47C441AN/AF			16	1		4						●						●	42	44		●	
		KMP47C443N/M/DM	8				1	8				1		●						●	28	28		●	◉
		KMP47C446ADF		24		1		4						●					●			64		●	
		*†KMP47E486M												●						●		28		●	●
		*†KMP47E487M												●						●		28		●	●
	768	KMP47C407AN/AF				1						1				●				●	42	44		●	●
		KMP47C451BN										1				●				●	30			●	◉
		KMP47C452BN/BF				1						1				●				●	42	44		●	◉
		KMP47C453AN/AF				1						1				●				●	42	44		●	◉
		KMP47C454AN										1				●				●	30			●	●
		KMP47C456ADF		32		1						1		●		●			●			80			●

* : Under development †: USP4, 382, 279 owned by BULL CPU8

KLCS-47E Series

Product No	Function		ROM (bytes)	RAM (nibbles)	I/O port	Minimum instruction execution time (μs)	Power Supply Voltage (V)	Package	Built-in One-time PROM product
KMP47C101P/M	LED driver		1k	64	11	1.3	2.2 to 5.5 (note2)	DIP16 SOP16	KMP47P201VP
KMP47C201P/M			2k	128					
KMP47C102P/M			1k	64	15			DIP20 SOP20	KMP47P202VP/VM
KMP47C202P/M			2k	128					
KMP47C206P/M						1.0	4.0~5.7	DIP20 SOP20	TMP47P206VP/VM
KMP47C103N/M	8-bit SIO		1k	64	23	1.3	2.2 to 5.5 (note2)	SDIP28 SOP28	KMP47P403VN/VM
KMP47C203N/M			2k	128					
KMP47C241N/M	A/D converter				21		2.7 to 6.0		KMP47P241VN/VM
KMP47C243N/M/DM	A/D converter 8-bit SIO pulse output				23	1.0	2.2 to 5.5 (note 2)	SDIP28 SOP28 SSOP30	KMP47P443VN/VM/VDM
KMP47C443N/M/DM			4k	256					
KMP47C222N/F		LCD driver	2k	192	22	1.0 (244)	2.2 to 5.5	SDIP42 QFP44	KMP47P422VN/VF
KMP47C422N/F			4k	256					
*† KMP47E186M	E^2PROM (16byte), SPI		1k	64	11	1.3	2.0 to 5.5 (note 3)	SOP16	KMP47P186M(note 4)
KMP47E187M	E^2PROM (16byte), SPI		1k	64	11	1.3	2.0 to 5.5 (note 3)	SOP16	KMP47P187M
*† KMP47E486M	E^2PROM		4k	256	21	1.3	2.7 to 5.5	SOP28	KMP47W486M
*† KMP47E487M	E^2PROM		4k	256	21	1.3	2.7 to 5.5	SOP28	KMP47W487M

* : Under development
† : USP4, 382, 279 owned by BULL CPU8

Note1 : ( ) ; the minimum instruction execution time when low-frequency clock is used.
Note2 : OTP built-in Type is under consideration for high-temperature range/high-quality applications.
Note3 : 2.7 to 5.5V when oscillator is connected, 2.0 to 3.4V during CR oscillation.
Note4 : KMP47P186M (CR oscillation), KMP47P187M (oscillator version)

KLCS-47 Series

Product No	Function		ROM (bytes)	RAM (nibbles)	I/O port	Minimum instruction execution time (μs)	Power Supply Voltage (V)	Package	Built-in One-time PROM product
KMP47C200BN/BF	Standard (LED driver)		2k	128	36	1.9	2.7 to 6.0	SDIP42 QFP44	KMP47P400VN/VF
KMP47C400BN/BF			4k	256					
KMP47C210AN/AF	VFT driver		2k	128	36		4.5 to 6.0	SDIP42 QFP44	KMP47P410AN/AF
KMP47C410AN/AF			4k	256					
KMP47C212AN			2k	128	35			SDIP42	-
KMP47C412AN			4k	256					
KMP47C221ADF	LCD driver		2k	192	28			QFP64	KMP47P421ADF
KMP47C421ADF			4k	256					
KMP47C423ADF		High-speed event counter							-
KMP47C231AN	D/A conversion (PWM) output LED driver	4-bit A/D conversion input, remote control pulse detector	2k	128	24			SDIP30	-
KMP47C233AN		3-bit A/D conversion input			36			SDIP42	
KMP47C433AN			4k	256					
KMP47C242BN	A/D converter, watchdog timer	LED driver	2k	128	23		2.7 to 6.0	SDIP30	KMP47P242VN
KMP47C440AN/AF			4k	256	34		4.5 to 6.0	SDIP42 QFP44	KMP47P440AN/AF
KMP47C441AN/AF		VFT driver							KMP47P441AN/AF
☆ KMP47C446ADF		LCD driver			24	1.9 (244)		QFP64	KMP47P446VDF
KMP47C451BN	DTMF generator			768	23	16.7	2.2 to 6.0	SDIP30	KMP47P451VN
KMP47C452BN/BF					35			SDIP42 QFP44	KMP47P452VN/VF
KMP47C453AN/AF						8.3			KMP47P453VN/VF
KMP47C454AN					23	2.1	2.7 to 6.0	SDIP30	KMP47P454VN
KMP47C407AN/AF					35			SDIP42 QFP44	KMP47P407VN/VF
KMP47C456ADF		LCD driver			34	8.3 (244)		QFP80	-

Note : ( ) ; the minimum instruction execution time when low-frequency clock is used.
☆ : These package types will be delivered in the short lead length package.
Type suffix P : Plastic dual in-line package (DIP) M : Plastic small outline package (SOP)
N : Plastic shrink dual in-line package (SDIP) E : Ceramic shrink dual in-line package (SDIC)
F : Plastic flat package (QFP) G : Ceramic standard flat package (QFC)

KLCS-470A Series

Product No	Function	ROM (bytes)	RAM (nibbles)	I/O port	Minimum instruction execution time (μs)	Power Supply Voltage (V)	Package	Built-in One-time PROM product
KMP47C623F	LCD driver (24 to 20×4), High-speed event counter	6k	384	32 to 28	1.3 (244)	4.5 to 6.0	QFP64	KMP47P823VF
KMP47C823F		8k	512					
KMP47C1220F	LCD driver (32×4), High-speed timer/counter	12k	768	36			QFP80	KMP47P1620VF
KMP47C1620F		16k						
KMP47C637N	On-screen display circuit, D/A conversion (PWM) output, 4-bit A/D conversion input, Remote control pulse detector	6k	384	32			SDIP42	KMP47P1637VN
KMP47C837N		8k						
KMP47C1237N		12k	512					
KMP47C1637N		16k						
KMP47C1238AN		12k		41			SDIP54	KMP47P1638VN
KMP47C1638AN		16k						
KMP47C853N/F	DTMF generator	8k	1024	35	8.3 (244)	2.2 to 6.0	SDIP42 QFP44	KMP47P853VN/VF
KMP47C457N/F		4k	768		2.1 (244)	2.7 to 6.0		KMP47P857VN/VF
KMP47C857N/F		8k	1024					
KMP47C1260N/F	A/D converter (8bits×8ch), Remote control pulse detector, LED driver	12k	768	56	1.3 (244)	4.5 to 6.0	SDIP64 QFP64	KMP47P1660VN/VF
KMP47C1660N/F		16k						
KMP47C1270AN	VFT driver (16×18 to 13×16), D/A conversion (PWM) output, 4-bit A/D conversion input, Remote control pulse detector	12k		53			SDIP64	KMP47P1670VN
KMP47C1670AN		16k						

note : ( ) ; the minimum instruction execution time when low-frequency clock is used.

Type N : Plastic shrink dual in-line package (SDIP) E : Ceramic shrink dual in-line package (SDIC)
F : Plastic flat package (QFP) G : Ceramic standard flat package (QFC)

KLCS-47E, 47, 470 series (Wide-temperature range/High-quality products)

Product No	Function	ROM (bytes)	RAM (nibbles)	I/O port	Minimum instruction execution time (μs)	Power Supply Voltage (V)	Operating temperature (℃)	Package	Built-in One-time PROM product (note 2)
* KMP47C101WP	LED driver	1k	64	11	1.3	2.2 to 5.5 (note 3)	-40 to 110	DIP16 SOP16	KMP47P201VP
* KMP47C201WP		2k	128				-40 to 110		
†KMP47E186M	E^2 PROM (16 bytes), SPI	1k	64			(note 4)	-40 to 85	SOP16	KMP47P186M (note 5)
KMP47E187M	E^2 PROM (16 bytes), SPI	1k	64			(note 4)	-40 to 85	SOP16	KMP47P187M
KMP47C241IN/IM	A/D converter LED driver	2k	128	21		2.7 to 6.0	-40 to 85	SDIP28 SOP28	KMP47P241VN/VM
KMP47C241WM							-40 to 110		KMP47P241VN
† KMP47E885IF	E^2 PROM (64 bytes), PWM, UART A/D converter 16-bit timer/counter Input Capture, Output compare	8k	512	36		4.5 to 5.5	-40 to 85	QFP44	KMP47P885F
† KMP47E885WF							-40 to 110		

* : Under development
†: USP4, 382, 279 owned by BULL CP8

Type suffix
P : Plastic dual in-line package (DIP)
M : Plastic small outline package (SOP)
N : Plastic shrink dual in-line package (SDIP)
F : Plastic flat package (QFP)

note 1 : If there is any further information you require when considering I/W version products, please contact our sales representative.
note 2 : OTP built-in type is under consideration for high-temperature range/high-quality applications.
note 3 : During CR oscillation (2.7 to 5.5V when oscillator is connected).
note 4 : 2.7 to 5.5V when oscillator is connected, 2.0 to 3.4V during CR oscillation.
note 5 : KMP47P186M (CR oscillation), KMP47P187M (oscillator version)